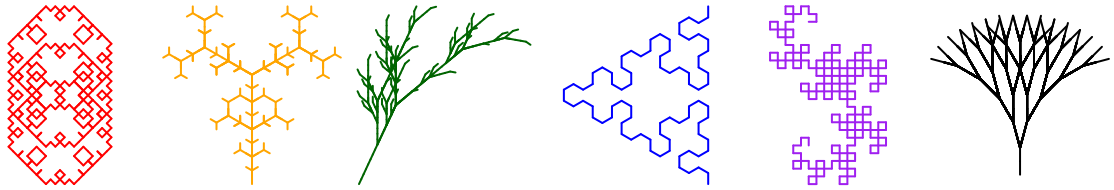
Name: _____ Date: _____

Lindenmayer Systems and Turtle Graphics



A Lindenmayer system (or L-system) is a set of rewrite rules. When these rules are repeatedly applied to a starting string ("word"), we can get complex results from simple rules. For example:

```
Start:
    x
Rules:
    A = A-
    x = Ax
    - = -
(The "-" character is a constant. We usually don't bother listing constants.)
The start string and first 4 recursions:
    0. x
    1. Ax
    2. A-Ax
    3. A--A-Ax
    4. A---A--A-Ax
```

Practice

```
Start:
    A
Rules:
    A = -B
    B = -AB
The start string and first 4 recursions:
```

0. A

1. -B

2. --AB

3. ---B-AB

4. ----AB--B-AB

When L-system strings' characters correspond to drawing commands, we can get fractal-like patterns.

Use the following table of drawing commands:

```
F = Move forward one step while drawing line
X = Move forward one step without drawing line
+ = Turn right 90°
- = Turn left 90°
[ = Save current position (x, y, and direction) to top of list
] = Teleport to top-of-list position (without drawing); erase top-of-list position
```

Starting at $(0, 0)$ pointing up, draw the pattern described by the commands in the string below:

```
FF[+F-F][-F+F]xFFF[+F-F][-F+F]xF[+FF[+F-F][-F+F]xF
-FF[+F-F][-F+F]xF][-FF[+F-F][-F+F]xF+FF[+F-F][-F+F
]xF]xFF[+F-F][-F+F]xF
```